

PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q98835

Klaus LENHART

Appln. No.: 10/511,294

Group Art Unit: 3679

Confirmation No.: 2233

Examiner: Ernesto Garcia

Filed: October 15, 2004

For: ADJUSTABLE-LENGTH TUBE, IN PARTICULAR FOR POLES

DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Klaus Lenhart, hereby declare and state:

THAT I am a citizen of Germany;

THAT I am the owner and president of Leki Lenhart GmbH, the assignee of the present application, and have been working in the field of walking and skiing sticks for over 20 years as entrepreneur in my own company.

THAT I am the inventor of the invention disclosed and claimed in the present application, and also am the inventor named in German patent DE-29,706,849 (Lenhart). I also am the inventor of at least 2 U.S. patents in the field of collapsible and telescoping sticks

THAT I have reviewed the outstanding rejection by the US Examiner in the above referenced application, including the prior art cited and applied in various combinations by the

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Examiner, including Lenhart (DE-29,706,849), Neuheiten (Swiss Patent CH-267,177), DSI (DE-8,004,343 U1), Kupski (US-3,145,669) and Mazzolla (US-4,238,164).

THAT none of the prior art references, alone or in combination, teach or suggest my invention as set forth in the currently pending claims and the claims as amended by the accompanying Supplemental Submission Under 37 C.F.R. § 1.114(c). Moreover, the prior art references are incompatible with each other and are not combinable in a manner that would lead to my invention and, in fact, are even incompatible with respect to each of multiple embodiments that are disclosed in each reference, as detailed subsequently.

THAT the original specification fully supports my invention as set forth in the currently pending claims and the claims as amended by the accompanying Supplemental Submission Under 37 C.F.R. § 1.114(c).

I. The Claimed Invention

A. Claim 8

The invention as now defined in amended independent claim 8 is clearly supported by the original disclosure, as demonstrated by the following current text, as amended by the accompanying Supplemental Submission under 35 U.S.C. § 114(c) and as annotated with reference characters from Figs. 1-3 and the paragraphs of the attached published U.S. Application No. 2005/0207829 (**Attachment A**). Annotated and amended claim 8 recites as follows:

An adjustable-length pole (**10**), the pole comprising:
at least one outer tube (**12**);

an inner tube (11) structured and dimensioned for insertion into the outer tube in a telescoping fashion for adjusting a length of the pole;

a limit stop (28) disposed at an end of the inner tube;

an adjusting screw (18) being axially oriented within the outer tube, non-rotatable with respect to the inner tube and supported in a fixed manner on the end of the inner tube;

a limit stop (26) disposed on a free end of the adjusting screw;

a radially spreadable element (16) with a non-threaded bore (37) and with only one single inner cone (27), the inner cone opening towards the end of the inner tube (11), wherein the radially spreadable element is disposed with its axial length between the limit stop disposed at the end of the inner tube (28) and the limit stop (26) disposed on the free end of the adjusting screw, and wherein the distance between the limit stops is larger than the axial length of the radially spreadable element by a gap distance (a), such that the radially spreadable element is moveable axially within the distance between the limit stops, including the gap distance, without rotation thereof and is contactable with each limit stop (See [0023]; element 16 has a main body 23, pot base 36 and shoulder 38; Fig. 1 shows contact with stop 26 and contact of shoulder 38 of element 16 with stop 28 occurs due to axial force, as explained in [0030]; lack of rotation is explained at paragraph [0026]); and

an interior element (17) having an internal threaded bore (21) and an outer cone (22) tapering towards the free end of the adjusting screw and being structured, dimensioned, and disposed for cooperation with the inner cone (27) of the radially spreadable element (16), wherein the interior element is screwed onto the adjusting screw and is axially movable with respect to the inner tube by rotation thereof via the internal threaded bore ,

wherein the radially spreadable element and the interior element cooperate to form a spreading device (15) supported axially at the end of the inner tube, the spreading device for clamping the inner tube within the outer tube.

B. Claim 15

The invention as now defined in amended independent claim 15 is clearly supported by the original disclosure, as demonstrated by the following current text, as amended by the accompanying Supplemental Submission under 35 U.S.C. § 114(c) and as annotated with reference characters from Figs. 1-3 and the paragraphs of the attached published application (2005/0207829). Annotated and amended claim 15 recites as follows:

An adjustable-length pole (10), the pole comprising:

at least one outer tube (12);

an inner tube (11) structured and dimensioned for insertion into the outer tube in a telescoping fashion for adjusting a length of the pole;

a limit stop (28) disposed at an end of the inner tube;

an adjusting screw (18) being axially oriented within the outer tube, non-rotatable with respect to the inner tube and supported in a fixed manner on the end of the inner tube;

a limit stop (26) disposed on a free end of the adjusting screw;

a radially spreadable element (16) with a non-threaded bore (37) and with only one single inner cone (27), the inner cone opening towards the end of the inner tube (11), wherein the radially spreadable element is disposed with its axial length between the limit stop disposed at the end of the inner tube (28) and the limit stop (26) disposed on the free end of the adjusting screw, and wherein the distance between the limit stops is larger than the axial length of the radially spreadable element by a gap distance (a), such that the radially spreadable element is moveable axially within the distance between the limit stops, including

the gap distance, without rotation thereof_(See [0023]; **element 16 has a main body 23, pot base 36 and shoulder 38; Fig. 1 shows contact with stop 26 and movement so that shoulder 38 of element 16 contacts stop 28 occurs due to axial force, as explained in [0030]; lack of rotation is explained at paragraph [0026]); and**

an interior element (17) having an internal threaded bore (21) and an outer cone (22) tapering towards the free end of the adjusting screw and being structured, dimensioned, and disposed for cooperation with the inner cone (27) of the radially spreadable element (16), wherein the interior element is screwed onto the adjusting screw and is axially movable with respect to the inner tube by rotation thereof via the internal threaded bore ,

wherein the radially spreadable element and the interior element cooperate to form a spreading device (15) supported axially at the end of the inner tube, the spreading device for clamping the inner tube within the outer tube,

wherein said interior element (17) has a plurality of radially protruding fins (41), each of which is guided in an axial slot (43) of the radially spreadable element (17) for axial movement thereof (see [0026] and Figs 1-3 where fin 41 extends partway into slot 43, which is formed in the radially thick walls of the spreadable element 16, and axially guided so that it is effective to prevent rotation of spreadable element 16 with respect to interior element 17), and

wherein said axial slots (43) have an axial length which is larger than the axial length of said fins (17).

C. Claims 10 and 16

Claims 10 and 16 have added limitations that are similar to amended claims 8 and 15 and the foregoing demonstration of support for the limitations in the claims 8 and 15 would apply to claims 10 and 16, respectively.

D. Claims 21 and 23

Claims 21 and 23 have support in Fig. 2 and at paragraph [0027].

II. The Prior Art

A. Fig 1 of Lenhart is Problematic and Inoperable

Lenhart comprises three different structures as spreading devices, axial cuts of these three embodiments are given in figure 3, 4 and 5, respectively. As one can see from these figures the basic element which joins these three structures is at least one spreadable element 16 which comprises an inner cone 27 which narrows towards the inner tube 11 (for a list of the reference numerals in Lenhart please see (**Attachment B**)). In the cavity in the spreadable element formed by this inner cone 27 there is an interior element with an outer cone 22 tapering towards the end 13 of the inner tube 11. A gap 23 can be provided between end 13 and the spreading device 15.

Considering specifically Fig. 1, in this case the spreadable element 16 comprises one single inner cone 27 tapering towards the end 13 of the inner tube 11. As described on page 8, second paragraph of Lenhart, when turning the inner tube 11 relative to outer tube 12 the friction between the spreadable element 16 and the inner wall of the outer tube 12 is sufficient to maintain the spreadable element rotationally fixed relative to the outer tube 12.

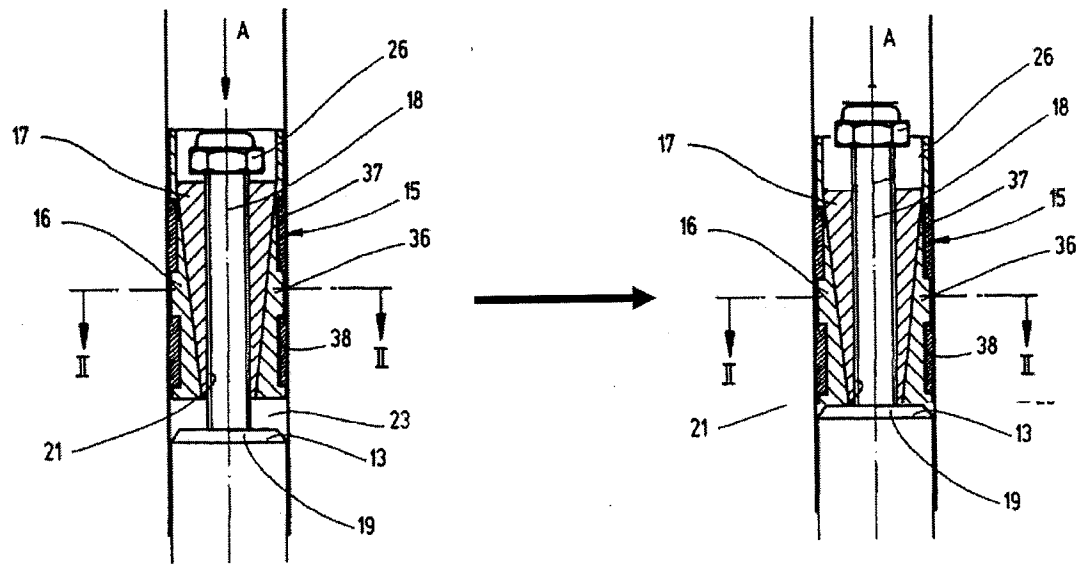
Translation of Lenhart p8, second paragraph:

As soon as the spreading device 15 mounted axially on the inner tube is inserted into the outer tube 12 with the aid of the bulging insertion part 28, a sufficient friction between the elastic rings 37, 38 and the inner surface of the outer tube 12 is established permitting the spreading motion; in other words, the inner tube 11 can be rotated, wherein the adjusting screw rotates concomitantly.

Due to this the interior element 17 is moving along the adjusting screw with the outer threading 18 in the direction of arrow A towards the end of the inner tube 11, whereas the spreadable element 16 due to the friction fit remains fixed and is, due to the axial relative motion between interior element 17 and spreadable element 16, smoothly and with its full surface cylindrically spreaded. Due to this the friction fit between the outer circumference of the spreadable element 16 and the inner circumference of the outer tube 12 is increased. Loosening of this friction fit connection is effected by turning back of the inner tube 11 and correspondingly of the adjusting screw 13.

Since the adjusting screw 18 is rotationally fixed to the inner tube 11, rotation of the inner tube has the effect that the interior element 17 due to its interior threading 21 travels downwards towards the end 13 of inner tube 11. Naturally, during the first few rotations of the inner tube, first the whole spreading device 15 is drawn towards the end 13 of the inner tube to close the space 23, or rather the inner tube is drawn into the outer tube since the spreadable element is frictionally fixed to the outer tube by elements 37 and 38.

The result of the first few rotations of the inner tube may be visualized by the left and right illustrations below:



As is clear from the figures and the foregoing explanation, the only possibility that the spreadable element 16 can be spread based upon rotation of the inner tube will occur when the spreadable element 16 abuts with the plug 19 at the end 13 of the inner tube. However, if, as indicated in figure 1 and figure 3 the narrow end 24 of the interior element 17 also is flush with the lower end of the spreadable element, no spreading of the spreading device 15 is possible. Thus, the illustrated structure would be inoperative.

Only if the narrow end 24 of the interior element 17 is not flush with the lower end of the spreadable element 16 but somewhat above, can the interior element 17 be drawn downwards relative to the spreadable element 16. However, this arrangement is not disclosed. Even if disclosed, such arrangement would result in friction between the lower surface of the spreadable

element 16 and plug 19, leading to a high likelihood of co-rotation of the spreadable element.

Thus, even with this correction, the illustrated structure would not be effective.

In any case if after tightening the connection additional axial pressure is exerted onto outer tube along arrow A in figure 1, due to the abutment of the lower surface of the spreadable element 16 on plug 19 there can be no additional clamping force (see figure on the right given above).

As would be clear to those skilled in the relevant art, the disadvantages of the construction in Fig. 1 are therefore at least as follows:

- until the actual spreading effect takes place, rotation of interior tube merely leads to a drawing of the inner tube into the outer tube until lower surface of spreadable element 16 abuts with plug 19; before that it is impossible that interior element 17 is drawn into the spreadable element 16 for spreading thereof as there is no counterforce;
- once the lower surface of spreadable element 16 is in contact with plug 19, a counterforce is established and interior element 17 upon continued rotation is drawn into spreadable element 16 (assuming that geometry allows, which it does not in figure 1 and figure 3!); the counterforce is established by contact of spreadable element with plug 19 leading to substantial friction and frequent initiation of co-rotation spreadable element 16 with inner tube 11 such that no clamping takes place at all;

- since lower surface of spreadable element 16, if the spreading device is fully clamped, is in full contact with plug 19, no additional clamping is possible; and, if for whatever reason there is a small gap, additional axial force along arrow A will even lead to a loosening of the clamping as the interior element 17 will be shifted out of the cavity of the spreadable element 16;
- unlocking the mechanism by rotating back the inner tube 11 will initially simply lead to rotation of the adjusting screw 18 out of the interior element. As there is no counterforce in place and as there is friction between the outer cone of the interior element and the inner cone of the spreadable element, the actual clamping between these two elements is not released. This clamping condition is maintained until limit stop element 26 (nut) abuts with wide end 25 of the interior element. Further rotation is then not possible and gap 23 will be maximal. As a matter of fact loosening of the clamping in this construction is now only possible if a force is exerted on spreadable element 16 along arrow A in figure 1 pushing interior element 17 and spreadable element 16 away from each other, essentially forcing spreadable element 16 along arrow A to close the gap 23.

All these problems that I encountered with my prior design required solutions that formed a basis for the making of the invention as disclosed and claimed in the above application.

B. Fig. 1 and Fig. 5 of Lenhart Are Incompatible With Each Other

Figure 5 of my previous invention according to document Lenhart is described exclusively in the paragraph bridging pages 9 and 10:

Translation of Lenhart p9/10, second paragraph:

In the embodiment as illustrated in figure 5 the spreading device 115 has two interior elements 117 and 117' which are mounted axially one behind the other such that their outer cones 122 and 122' are directed against each other, i.e. they are arranged such that their ends with smaller diameter are facing each other. The one interior element 117 is mounted on a threaded rod 118 with for example a right-handed thread and the other interior element 117' on a threaded rod 118' with for example a left-handed thread. The two threaded rods 118 and 118' are rotationally fixed with each other. The threaded rod 118 which is antecedent in insertion direction has the limit stop element 126, while the other threaded rod 118' is rotationally fixed on inner tube 111. The spreadable element 116 of the spreading device 115 is one piece and has, on its end receiving the interior element 117 a first inner cone 127, and on its end receiving the interior element 117' a second inner cone 127'. Upon rotation of the inner tube 111 and of the rotationally fixed joined threaded rods 118 and 118' the two interior elements 117 and 117' travel towards each other, such that spreading of the spreadable element 116 results. The spreadable element 116 according to figure 5 comprises, as the spreadable element 16 according to figure 2, two correspondingly structured, axially arranged in tandem and partially embedded elastic rings 137 and 138.

As one can see for example due to the fact that there is two threaded rods of **different** sense of rotation of the threading and correspondingly two different interior elements with opposite interior threading, this is a completely different embodiment. Indeed in this embodiment when starting to rotate interior tube 111 clamping immediately takes place as the two interior elements immediately start travelling towards each other. The only common element of this embodiment with the embodiment according to figure 1 is the fact that there is an

upper interior element 117. The rest of the structure in the embodiment for Fig. 5 is completely different from that of Fig. 1.

As concerns the functioning this becomes apparent when analysing what happens during rotation, and indeed most of the problems of the above-mentioned embodiment according to figure 1 do not occur. The embodiment according to figure 5 has however different disadvantages which are as follows:

- the construction is very complicated and expensive (two different threaded rods; the rods have to be joined somehow; two different interior elements with different threadings are required; a complicated assembly with many failure possibilities results);
- spreading takes place at the two terminal ends of the spreadable element and not centrally. This leads to an uneven distribution of the radial pressure which focuses on the terminal ends of the spreadable element. The achievable clamping force is therefore not as high.
- if additional axial pressure is exerted on such a device it will have the effect that the spreadable element 116 will be forced downwards in figure 5.

Correspondingly, the clamping effect associated with the upper cone 117 will be reduced, if not completely eliminated. On the other hand the clamping force associated with the lower cone 117' is increased. The net result is that there will be no additional clamping force. A specific problem in this situation is that a very localised force at the very terminal lower end of the spreadable element is then

established which not only has a reduced effective clamping effect but which may even lead to a local deformation of the outer tube.

Considering the above one notes that the lower interior element 117' on the one hand acts to provide a counterforce for the spreadable element 116 on rotation of the inner tube 111 such that the spreading effect is initiated immediately and gap 23 according to figure 1 is not first reduced until the spreading takes place. On the other hand lower interior element 117' simplifies loosening of the spreading device as upon rotation of the inner tube in a counter direction interior elements 117 and 117' are distanced from each other.

Due to the twin cone construction, the upper cone 117 as well as the lower cone 117' both each have an axial length which is much less than half of the full axial length of the spreadable element 116. Correspondingly only if both cones 117 and 117' are exerting radial forces the spreadable element 116 provides an essentially uniform pressure around the circumferential surface and the elastic rings 137 and 138.

One notes that if axial force is applied to such a spreading device, the spreadable element 116 due to the friction with the inner surface of the outer tube will be shifted downwards. This in turn drives the upper interior element 117 out of the upper inner cone 122 leading to a reduction of the radial force in the upper portion of the spreading element. In turn, the spreadable element 116 is driven onto the lower interior element 117' increasing radial pressure in this very lowest part of the spreadable element 116. What results is a deformation of the spreadable element 116 such that it is so to speak tapering towards the top. Correspondingly

there is a very local increase of the radial force in the lower part and a reduction in the upper part.

Just considering radial forces the result at first sight seems to be a zero net effect as the reduction in the upper part will essentially be compensated by the increase in the lower part. However, the clamping force is defined by the friction between the outer surface (or the elements 137, 138) of the spreadable element. This friction depends on the contact surface with the inner surface of the outer tube. So the net effect in this situation is not maintenance of essentially the same clamping force but a reduction as due to the deformation of the spreadable element the effective surface available for establishing friction is reduced. The increase in radial force in the lower part can therefore not compensate the loss of radial force in the upper part as concerns the clamping effect.

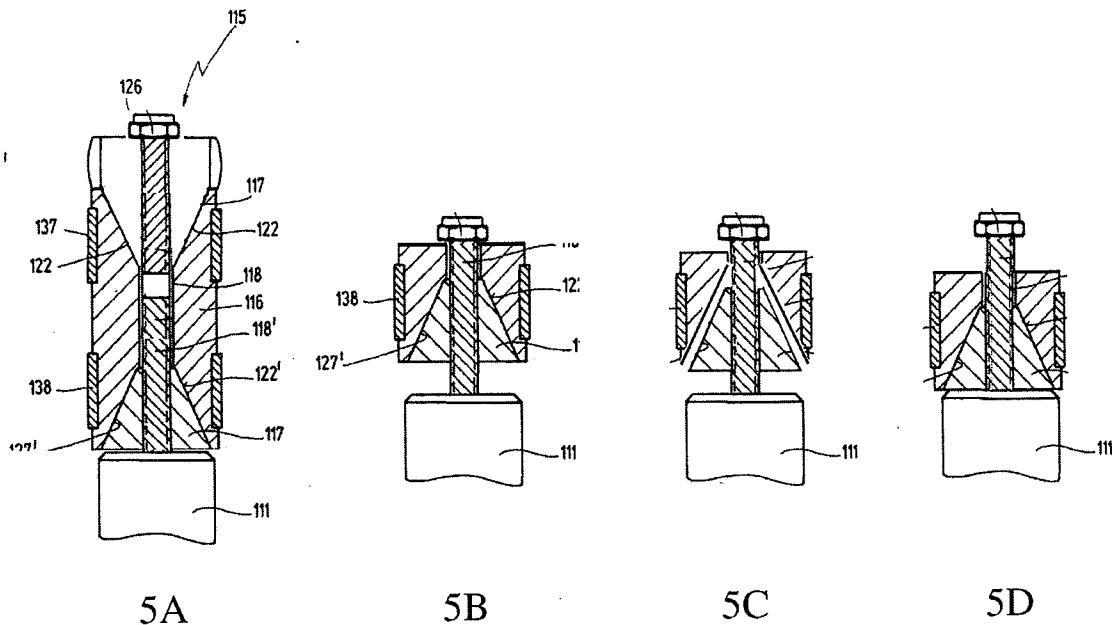
C. Deletion of Upper Part of Lenhart is Unsupported and Inoperative

Just considering figure 5 of Lenhart, as illustrated below, it is important to note that first of all the essential element of this application of Lenhart is the upper cone 117.

Omission of the upper cone would therefore go against the actual teaching of Lenhart and indeed at the time when I conceived the present invention I never considered omitting upper interior element 117 as this element to be essential to my previous invention as described in Lenhart.

Even if I had considered omitting upper interior element 117 such a construction would have been inoperative for the following reasons:

Assume that one skilled in the art would simply omit upper interior element 117: one skilled in the art can easily see from figures 5A-5D that such a construction would not have any clamping effect. As illustrated in Figure 5A upon rotation of inner tube 111 the threaded rod 118' would simply travel into lower interior element 117 until the latter abuts with the end of the inner tube. There is no upper limit stop for the spreadable element which can be reached and provide the counter force for effective clamping. This arrangement is illustrated in the left side figure 5A below for the situation when the inner tube hits the lower interior element 117,



As illustrated in the figure 5B above, if the upper half of figure 5 of Lenhart is deleted, further a limit stop (nut displayed in figure 5B) has to be added to the screw, for which there is not teaching or suggestion in Lenhart. When fastening this mechanism, a situation as illustrated

in the figure 5B will be reached, as the spreadable element will hit the upper limit stop and then the interior element will be forced into the spreadable element. This however only if the friction between the two cones is large enough to prevent co-rotation of the interior and the spreadable element. If the friction is not large enough between the two cones, the interior element it is as if the two elements were not in contact (see Figure 5C) and the interior element would rotate with the screw and not travel into the spreadable element, thus it would simply be impossible to establish any clamping by rotation of the inner tube 111. In fact, the interior element would simply spin and would not move axially as the threaded shaft is turned.

If trying to unfasten such a hypothetical mechanism, and the inner tube is rotated in the opposite direction, the first rotations will simply make the screw travel into the interior element. This until a situation is reached as given in above figure 5D, so until the interior element hits the inner tube. Unfastening is thus not possible at all..

Even if (hypothetically) clamping would be possible, just using the lower cone 117' in figure 5 would lead to a highly local radial pressure only in the lowermost part of the spreadable element which is not sufficient for the desired clamping effect.

It is one of the important aspects of the present invention to have an interior element which has a longer axial length than half of the length of the spreading element, but which nevertheless has a shorter axial length than the total spreadable element. Furthermore, the cone of the interior element is shorter than the inner cone of the spreadable element, and the interior element is located, in an axial direction, centrally and approximately in the middle of the spreadable element such as to have no local radial pressure located at one of the terminal ends of

the spreading device but to have a central (seen in an axial direction) radial force leading to a large contact surface establishing effective friction with the inner surface of the outer tube.

That's why at the time of making my invention as described in Lenhart I never considered omitting the upper cone 117 and making the lower cone 117' the only one single inner element. It simply wouldn't work just like that, and indeed to have only one single inner element tapering towards the free end of the adjusting screw necessitated e.g. the provision of a clearly defined limit stop on the adjusting screw for the spreadable element. The provision of a clearly defined limit stop on the adjusting screw is something that is neither necessary nor anywhere addressed in Lenhart.

D. Neuheiten's Figs Are Incompatible With Lenhart

As concerns Neuheiten, the important description concerning figures 5 and 6 of this document can be found on page 2, lines :53-74:

Translation of Neuheiten 2:53-74:

In the embodiment according to figure 5 and figure 5a the blocking element consists of four elements forming a hollow cylinder body 18, which on both end faces each has a conical recess 19. Into the lower recess in 19 fits the conical part 20 of the threaded rod 12, while into the upper recess 19 a cone with a through bore is put. Upon relative rotation of the parts 6, 7 these means 12, 14, 15, 20, 21 generate pressure on the blocking element, and the two cones 20 and 21 press the elements 18 of the blocking element. For loosening of the blocking element, a ring spring 11 is provided, which acts such that the four elements 18 are contracted.

The embodiment according to the figures 6 and 6a distinguish it from the one according to figures 5 and 5a in that for the spreading of the elements 18 only the lower cone 20 is used.

Neuheiten therefore discloses a construction in which a nut 14 is mounted on the threaded rod 12, wherein a ring 15 is provided on the nut which makes sure that there is sufficient friction with the inner surface of the outer tube 6 such that nut 14 is essentially rotationally fixed with respect to the outer tube 6.

Neuheiten has no interior element provided with an inner threading. Most importantly, Neuheiten works with a completely different working principle, as the conical part 20 is rotationally fixed with respect to the inner tube 7 (part 20 forms part of threaded rod 12). For tightening the construction according to figure 5, inner tube 7 is rotated which in turn rotates conical part 20 and most likely also the four elements 18 and the upper conical part 21. The only element which surely does not rotate and is rotationally fixed with respect to the outer tube 6 is nut 14 and ring 15. Nut 14 thus exerts a purely axial pressure on to the construction. It is also possible that the frictional conditions are such that elements 18 and 21 stay rotationally fixed with outer tube 6. Neuheiten is however silent about this.

Neuheiten's designs are therefore incompatible with my previous invention as described in Lenhart, working with an interior element with a threading travelling in a spreading element.

E. Lenhart and Neuheiten Are Incompatible With the Invention As Claimed

At the time of making present invention I did not have Neuheiten at hand. Even if at that time I would have had this disclosure at hand it would not have motivated me to modify the

construction according to my previous invention in Lenhart to obtain the present invention.

Similarly, one skilled in the art would not look to Neuheiten to modify Lenhart as Neuheiten has at least the following problems:

- Neuheiten proposes a system with high rotational friction. If elements 18 are rotationally fixed with respect to outer tube 6, upon fixing the spreading device there will be high friction along surface 19. Otherwise there will be high friction between elements 21 and nut 14. High friction is bad for this type of clamping mechanism as it leads to co-rotation of the fixing elements with the inner tube.
- the construction according to Neuheiten comprises a large number of parts which makes the device costly, complicated and delicate.
- as detailed above it is not simply possible to omit the upper cone of the construction according to my previous invention as disclosed in Lenhart as at least there would be the problem of a limit stop for the spreadable element. If I had considered omitting the upper cone of the construction according to my previous invention based on Neuheiten, Neuheiten would not have given me the solution to this problem as Neuheiten has a completely different mechanism in which the lower cone is not travelling on a threaded rod.

Any suggestion by the combination of Figs. 5 and 6 of Neuheiten to provide a hypothetical construction that removed the upper structure in figure 5 of my previous invention as disclosed in Lenhart would lead to a construction that is inoperative. The lower interior

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element 117' of my previous invention would be rotationally fixed and screw 126 would be replaced by a nut 14 with ring 15 according to Neuheiten.

F: Summary of important aspects

To summarize I would like to state that, in spite of the fact that I myself developed the construction according to Lenhart, I have never commercially implemented the Lenhart clamping mechanism; this should already indicate that the present invention is a significant breakthrough development over Lenhart. Indeed, as a matter of fact, the construction according figure 1 of Lenhart was not useful in practice, since the cone has the wrong direction and correspondingly the clamping effect is not reliable enough under axial pressure. Furthermore, when fixing this clamping mechanism, the spreadable element, as outlined above, necessarily with its lower edge touches the upper edge of the inner tube under a strong friction. This has the effect that when trying to fasten the clamping mechanism, the spreadable element rotates together with the inner tube such that no clamping can be established. A further grave disadvantage is that the construction according to figure 1 of Lenhart, if placed into a fastened position, cannot be unfastened. Indeed when rotating the inner tube to unfasten the clamping mechanism, the interior element is moved until touching the screw head with its upper edge; however, it is impossible to move the interior element actively within the spreadable element in an upwards direction by rotating the inner tube. Actual unfastening can result if after such rotation of the inner tube one exerts a relatively large axial pressure onto the whole stick. The construction according to figure 5 of Lenhart has the biggest disadvantage in that it has the tendency to loosen

even under small torsional moments (screw with two threadings with opposite sense of rotation), that the radial clamping force is too much focused to the axial terminal ends of the spreadable elements (small effective clamping force under load in axial direction), and further in that the bulging area on the spreadable element is necessary, wherein this bulging area needs to be always in contact with the inner wall of the outer tube and correspondingly makes axial displacement of the two tubes relative to each other difficult even if the clamping mechanism is in a loosened state.

The construction according to Neuheiten has the great disadvantage that the lower cone is stationary with respect to the inner tube leading to an unacceptably high friction when trying to fasten the mechanism.

It is an important aspect of my own invention to have recognized that for an efficient clamping mechanism there needs to be a spreadable element which doesn't travel with an inner threading on a screw, and that the spreadable element has limit stops in both axial directions. There is, however, a gap available to the spreadable element in axial direction, i.e. the spreadable element is not tightly clamped in the axial direction between the two limit stops. When fastening the mechanism, the spreadable element, relative to the screw, is shifted to a position in which the head of the screw is as one limit stop is in contact with the upper edge of the spreadable element. Then the gap is located at a position, namely at the end of the inner tube, such that the additional clamping effect under subsequent axial pressure is possible when the spreadable element is pushed towards the other limit stop.

When unfastening the mechanism the spreadable element is first shifted to a position into contact with the other limit stop, which then provides the counterforce to allow active withdrawal of the interior element out of the spreadable element and effective unclamping. So when unfastening the mechanism the inner tube is shifted towards the spreadable element and the gap disappears at the lower edge of the spreadable element and forms at the upper edge of the spreadable element, such that, subsequently, the interior element can actively be shifted down.

So both limit stops contactable by the spreadable element as well as the gap available between are of primary importance for a complete operation of the mechanism.

wards within the spreadable element, thereby loosening the clamping mechanism.

In addition to that, the interior element on the screw travels centrally, approximately in the axial middle portion of the spreadable element and due to the fins of the interior element, which can freely axially move in slots in the spreadable element, it is prevented that the interior element can rotate independent from the spreadable element but that nevertheless the interior element can travel in an axial direction within the spreadable element.

The construction according to my invention is undisputedly at the moment in this technical field the best system worldwide. It is the best combination of as low as possible torsional moments for fastening and at the same time as large as possible effective axial clamping effect. Inter alia, this shows in that my construction has obtained technical security certificates (German TÜV) in the form of special marks of conformity, which has not been achieved by any other clamping system. The superior properties of our system furthermore shows in that it is by far probably the most copied system (in particular copied by Asian

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producers, up to now already more than 15 different pirate designs that infringe my design have been tracked on the European market and measures have been taken, and also infringements have been tracked on the US market).

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 17.12.2008


Klaus Lenhart